



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2005TN17B

Title: Impacts of watershed urbanization on longitudinal fragmentation of stream habitat quality and fish habitat use

Project Type: Research

Focus Categories: Ecology, Surface Water, Sediments

Keywords: stream habitat, TMDLs, habitat alteration, siltation, aquatic habitat, modeling, urbanization, urban stream restoration

Start Date: 03/01/2005

End Date: 02/28/2006

Federal Funds: \$27,136

Non-Federal Matching Funds: \$62,717

Congressional District: TN2

Principal Investigator:

John Steven Schwartz

Abstract

Many rivers and streams in our nation have been identified on the 303(d) list as impaired or threatened as a result of siltation and habitat alteration. One major cause of siltation and habitat alteration is from watershed urbanization. Urbanization modifies the hydrologic regime causing increased sediment delivery to the channel from disturbed upland areas and increased stream bank erosion. An imbalance in sediment delivery to stream transport capacity degrades physical habitat quality reducing aquatic biological integrity. However, habitat degradation from urbanization is not uniform among the many reaches in a watershed causing fragmentation of good quality habitat. Habitat fragmentation can be defined as “poor” habitat quality reaches interspersed among “good” quality reaches that restrict an aquatic species from completing their life history. Practical tools to assess the spatial distribution of stream habitat quality are inadequate, and specifically those that can be applied to urban watersheds. The goal of the proposed research is to develop techniques for urban stream habitat assessment that quantifies the loss of longitudinal habitat structure in urbanizing watersheds, and can be correlated to existing bioassessment metrics (e.g., RPBIII scores). A better understanding of habitat fragmentation will aid TDEC in producing siltation and habitat alteration TMDLs.

Educational opportunities from the proposed research include support for graduate research assistants, and training other graduate students in the water resource program on field habitat survey techniques and ecological data analysis. This research also supports development of a new graduate-level course in ecological engineering at UTK.